

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
29 April 2004 (29.04.2004)

PCT

(10) International Publication Number  
**WO 2004/036147 A3**

(51) International Patent Classification<sup>7</sup>: **G01D 5/20**

(21) International Application Number:  
PCT/GB2003/004504

(22) International Filing Date: 16 October 2003 (16.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0224090.1 16 October 2002 (16.10.2002) GB  
0308257.5 9 April 2003 (09.04.2003) GB

(71) Applicant (for all designated States except US): **SENSOPAD TECHNOLOGIES LIMITED** [GB/GB]; Harston Mill, Harston, Cambridge CB2 5GG (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HOWARD, Mark, Anthony** [GB/GB]; Sensopad Technologies Limited, Harston Mill, Harston, Cambridgeshire CB2 5GG (GB). **SILLS, Colin, Stuart** [GB/GB]; Sensopad Technologies Limited, Harston Mill, Harston, Cambridgeshire CB2 5GG

(GB). **KREIT, Darran** [GB/GB]; Sensopad Technologies Limited, Harston Mill, Harston, Cambridgeshire CB2 5GG (GB). **JAMES, David, Alun** [GB/GB]; Sensopad Technologies Limited, Harston Mill, Harston, Cambridgeshire CB2 5GG (GB).

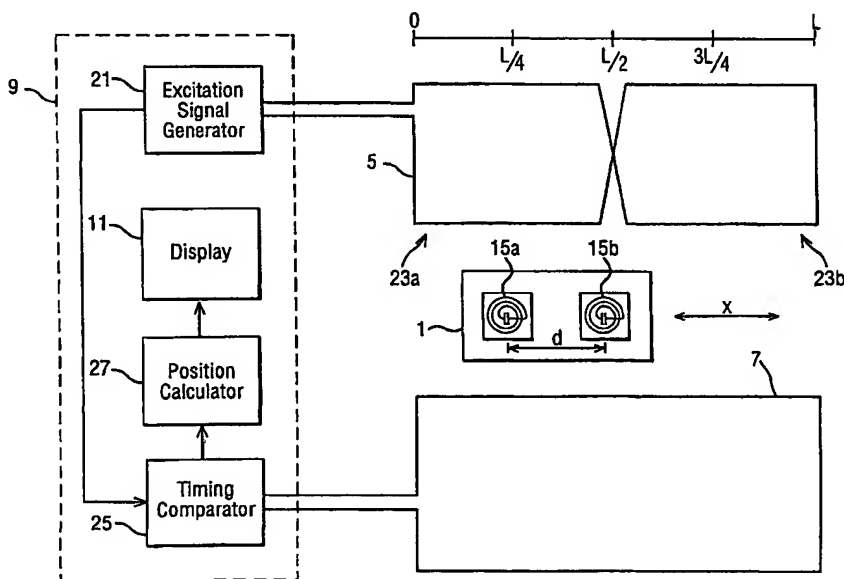
(74) Agents: **BERESFORD, Keith, Denis, Lewis et al.**; Beresford & Co., 16 High Holborn, London WC1V 6BX (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: POSITION SENSING APPARATUS AND METHOD



(57) Abstract: There is described an inductive position sensor in which a signal generator applies an excitation signal to an excitation winding formed on a first member, the excitation winding being electromagnetically coupled to at least two resonant circuits formed on a second member which are spaced from each other along a measurement path. The excitation windings are shaped so that the electromagnetic coupling between the exciting winding and each of the resonators varies along the measurement path. In this way, by applying an excitation signal to the excitation winding, respective different signals are induced in the resonators which depend upon the relative position of the first and second members.



**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**(88) Date of publication of the international search report:**  
5 August 2004

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/04504

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G01D5/20

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00/77480 A (SCIENT GENERICS LTD ;MORRISON EUAN (GB); CLARK VICTORIA ANN (GB);) 21 December 2000 (2000-12-21) page 6, line 1 - line 26 page 11, line 1 - line 24 page 19, line 20 -page 22, line 1 claim 34	1-7, 9-13, 15-20
A	US 5 815 091 A (ELY DAVID T ET AL) 29 September 1998 (1998-09-29)  column 1, line 4 - line 9 column 11, line 43 - line 47 column 13, line 67 -column 14, line 29 figure 11  --- -/-	1-7, 9-13, 15-20

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*A\* document member of the same patent family

Date of the actual completion of the international search

19 May 2004

Date of mailing of the international search report

01/06/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Keita, M

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 03/04504

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 5 796 250 A (DAMES ANDREW NICHOLAS)  18 August 1998 (1998-08-18)  abstract; figure 13</p>	1,2

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/04504

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0077480	A	21-12-2000	AU 5689900 A	02-01-2001
			EP 1203204 A2	08-05-2002
			WO 0077480 A2	21-12-2000
			GB 2359139 A ,B	15-08-2001
			JP 2003502628 T	21-01-2003
			US 6561022 B1	13-05-2003
US 5815091	A	29-09-1998	AT 165659 T	15-05-1998
			AU 679378 B2	26-06-1997
			AU 2451395 A	05-12-1995
			AU 4435797 A	26-02-1998
			BR 9507650 A	09-09-1997
			CA 2189959 A1	23-11-1995
			CN 1152954 A ,B	25-06-1997
			DE 69502283 D1	04-06-1998
			DE 69502283 T2	05-11-1998
			DK 760087 T3	22-02-1999
			EP 0760087 A1	05-03-1997
			ES 2115382 T3	16-06-1998
			WO 9531696 A1	23-11-1995
			HK 1010796 A1	25-06-1999
			JP 10500481 T	13-01-1998
			SI 760087 T1	31-10-1998
			US 2002179339 A1	05-12-2002
			US 6249234 B1	19-06-2001
			US 6489899 B1	03-12-2002
US 5796250	A	18-08-1998	AT 163227 T	15-02-1998
			AU 673429 B2	07-11-1996
			AU 6579194 A	21-11-1994
			BR 9406492 A	09-01-1996
			CA 2161961 A1	10-11-1994
			DE 69408534 D1	19-03-1998
			DE 69408534 T2	23-07-1998
			DK 696349 T3	23-09-1998
			EP 0696349 A1	14-02-1996
			ES 2112538 T3	01-04-1998
			WO 9425829 A1	10-11-1994
			GR 3026760 T3	31-07-1998
			JP 3472578 B2	02-12-2003
			JP 8509809 T	15-10-1996